IN THE CLAIMS:

Please rewrite the claims as follows:

1. (original) A method of calculating a sampling function for fabricating a N-channel grating, the method comprising the steps of :

- forming a summation of N periodic seeding functions each describing a refractive index variation, wherein each periodic function includes a phase shift value with respect to the other functions, and wherein at least one phase shift value is non-zero.

2. (original) A method as claimed in claim 1, wherein the summation of the N periodic functions comprises a Fourier analysis.

3. (original) A method as claimed in claim 2, wherein the result of the Fourier analysis is expressed as: $\sum_{l=1}^{N} \kappa e^{i[K_0 z+\theta+(2l-N-1)\Delta\kappa z/2+\phi_l]} = \kappa Q e^{i(K_0 z+\theta+\psi)}$.

4. (original) A method as claimed in ~~any one of claims~~ claim 1 ~~to 3~~, wherein the method further comprises the step of determining a set of the phase shift values for which a maximum value of the sampling function amplitude is minimised.

5. (currently amended) A method as claimed in ~~any one of claims~~ claim 1 ~~to 3~~, wherein the method further comprises the step of determining a set of the phase shift values for which a maximum difference between a maximum and minimum value of the sampling function amplitude is minimised.

6. (currently amended) A method as claimed in ~~any one of claims~~ claim 1 ~~to 3~~, wherein the method further comprises the step of determining a set of the phase shift values for which a mean-square- deviation in the sampling function is minimised.

7. (currently amended) A method as claimed in ~~any one of claims~~ claim 4 ~~to 6~~, wherein the step of determining the set of phase shift values comprises direct scanning through all combinations, or conducting a variational analysis, or using other forms of extremum search numerical techniques, or a simulated annealing Monte Carlo approach.

8. (currently amended) A method as claimed in ~~any one of the preceding claims~~ claim 1, wherein the grating is multi-dimensional, and wherein the periodic seeding functions are multi-dimensional.

9. (currently amended) A method for fabricating a multi-channel grating comprising the step of calculating a sampling function in accordance with a method as claimed in ~~any one of claims~~ claim 1 ~~to 8~~.

10. (original) A method as claimed in claim 9, wherein the multi-channel grating is fabricated utilising photo-induced refractive index changes in a photosensitive waveguide material.

11. (original) A method as claimed in claim 9, wherein the multi-channel grating is fabricated utilising etching techniques.

12. (original) A method as claimed in claim 9, wherein the multi-channel grating is fabricated utilising epitaxial techniques.

13. (original) A method as claimed in claim 9, wherein the multi-channel grating is fabricated utilising a developing technique.

14. (original) A method as claimed in claim 13, wherein the developing technique comprises a photo polymerisation process.

15. (currently amended) A multi-channel grating structure fabricated utilising a method of fabrication as claimed in ~~any one of claims~~ claim 9 ~~to 14~~.

Respectfully submitted,

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